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TIER I
OPERATING PERMIT
RENEWAL APPLICATION

UNIVERSITY OF IDAHO
MOSCOW, IDAHO

Prepared for:

University of Idaho
1108 W. Sixth Street
Moscow, ID 83844-2030

Prepared by:

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May 17, 2007

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May 17, 2007

Mr. Bill Rogers
Department of Environmental Quality
State of Idaho
1410 North Hilton
Boise, ID 83706

Dear Mr. Rogers:

RE: Tier I Operating Permit Renewal for University of Idaho, Moscow

On behalf of the University of Idaho (University), Bison Engineering, Inc., is pleased to submit this letter, attached forms, and supporting information, which constitute an application to renew Permit Number T1-060203 for the University (Facility ID No. 057-00025). This renewal is required under IDAPA 58.01.01.313.03, which requires a renewal to be submitted no less that six months before the current operating permit expires.

The University is also subject to a combination Permit to Construct (PTC) and Tier II Operating Permit number 057-00025. In a separate and simultaneous submittal, the University is requesting that the combination permit be transitioned to a PTC only.

The University is requesting that the Idaho Department of Environmental Quality (the Department) renew their Tier I permit with the requested minor amendments, but without changes to any substantive requirements. This cover letter includes descriptions of the requested minor permit revisions. Required information, as listed in the Department's Air Quality Operating Permit Application Checklist, is provided or otherwise addressed as follows:

Application Forms – Application forms are included as Appendix A to this letter. Included are Section 1: General Information, with updated general facility information, and Section 2: Fuel-Burning Equipment, with information about a boiler that the University is requesting be added to the permit. (See below for a description of and discussion about the new boiler.) The University has not filled out forms for emitting units which are currently on file with the Department, and which have not been changed. Note that the forms include a certification of truth, accuracy, and completeness signed by a responsible official for the University.

Source Descriptions – The University is requesting that an existing but inactive boiler be added to the permit with this renewal (see discussion below). The Section 2 form for this boiler, enclosed as Appendix A, provides detailed information about this source. Descriptions of other sources within the facility were submitted with the initial PTC/Tier II

permit application. Primary applications and supplemental information were submitted in 1995, 1996, and 1998. Applicable information has not changed since initial submittal.

Insignificant Emitting Units – The University has revised the list of insignificant emitting units and the associated emissions. The updated list can be found in the emission inventory located in Appendix B. The previous Tier I application provided individual forms for each insignificant unit. It is the University's understanding that those forms are not required, and they have not been provided in this application.

Source Flow Diagrams – Applicable information was submitted in 1995, 1996, and 1998. Applicable information has not changed since initial submittal.

Plot Plans – Applicable information was submitted in 1995, 1996, and 1998. Applicable information has not changed since initial submittal.

Emission Estimate References and Documentation – Appendix B to this letter provides updated estimates of emissions from all applicable facility sources. It also describes the methods and reference sources employed to derive the estimates.

Excess Emission Documentation – The University submits excess emissions reports for each occurrence. Past reports are on file with the Department.

Ambient Air Impact Analyses – Ambient concentration impact demonstrations are generally not required for Tier I Operating Permit renewal applications. Because the University is requesting the addition of a source to its renewed Tier I permit – subject to source approval via a PTC – concentration impacts for that source are addressed in a concurrent PTC application. The information is also provided below for reference purposes.

Compliance Assurance Monitoring Plan – Under the federal regulations located in 40 CFR 64.5, an applicant holding an operating permit under 40 CFR 70 must submit, upon application for renewal of the operating permit, a Compliance Assurance Monitoring (CAM) plan for applicable emitting units. If an emitting unit has the potential to emit uncontrolled emissions exceeding 100 tons per year, has an emission limit, and uses a control device to meet that emission limit, it is subject to the CAM regulations.

The University has completed a CAM evaluation for the emitting units at the campus. The University has determined that the wood-waste fired boiler (S-BA) is subject to the CAM requirements of 40 CFR 64 for particulate matter. Appendix C contains an emission unit-specific CAM evaluation, and the required CAM plan for the multiclone located on the wood-waste-fired boiler stack.

Regulatory Analysis – As the initial Tier I permit was issued in 2002, we have conducted a review of all current potentially applicable air quality regulations to ensure that any newly added or revised regulations are incorporated into the renewed permit. A

regulatory analysis is included in Appendix D listing applicable and nonapplicable air quality rules.

Compliance Plan and Certification – The University submits certifications of compliance with all permit conditions semi-annually. The most recent compliance certification was submitted in November 2006. The University certifies that it is currently in compliance with all applicable regulations. The University will continue to comply with applicable requirements for each permitted emissions unit. Further, for any applicable requirements that will become effective during the term of the renewed Tier I operating permit, the University will meet the applicable requirements on a timely basis or on the schedule provided in the applicable requirement as appropriate.

The remainder of this letter presents and describes specific requests for amendments to the permit.

Requested Changes to Tier I Operating Permit

Boiler Identification Changes – Please make the following changes to the boiler identification codes:

Boiler Description	Current Identifier	Revised Identifier
Wood-waste-fired boiler	S-B00	S-BA
Cleaver-Brooks natural gas-fired boiler	S-B0	S-BB
Babcock & Wilcox natural gas-fired boiler	Not in the current permit	S-BC
Combustion Engineering natural gas-fired boiler	S-B4	S-BD

Note that these identifiers occur throughout the permit, including paragraphs 1.3, 3.2, 3.3., 4, 4.1, 4.4, and 4.5.

Reduction of Allowable Operating Hours for Emergency Diesel Generators – Please reduce the annual allowable operating hours for the diesel-fired emergency electrical generators in paragraph 5.3 from 1,800 hours to 500 hours. A default value of 500 hours is standard for this type of source, and the University does not anticipate having to operate the generators more than 500 hours in a single year. The University has incorporated the 500 hour per year limit into the revised emission inventory in Appendix B.

Removal of 24-Hour Notification Requirement – Permit Condition 2.9.1 reads as follows (emphasis added):

"The person responsible for or in charge of a facility during an excess emissions event shall, with all practicable speed, *but no later than 24 hours after the event*, initiate and

complete appropriate and reasonable action to correct the conditions causing such excess emissions event; to reduce the frequency of occurrence of such events; to minimize the amount by which the emission standard is exceeded; and shall, as provided below or upon request of DEQ, submit a full report of such occurrence, including a statement of all known causes and of the scheduling and nature of the actions to be taken." [IDAPA 58.01.01.132, 4/5/00]

The citation for this condition (IDAPA 58.01.01.132) reads as follows:

"The person responsible for, or in charge of a facility during, an excess emissions event shall, with all practicable speed, initiate and complete appropriate and reasonable action to correct the conditions causing such excess emissions event; to reduce the frequency of occurrence of such events; to minimize the amount by which the emission standard is exceeded; and shall, as provided below or upon request of the Department, submit a full report of such occurrence, including a statement of all known causes, and of the scheduling and nature of the actions to be taken. (4-5-00)"

Note that the text for the permit condition and the text for the cited rule are substantially the same except for the addition of the 24-hour restriction in the permit. The University requests that the existing text in paragraph 2.9.1 be replaced with the text from IDAPA 58.01.01.132.

The University will continue to mitigate and report excess emissions as required in IDAPA 58.01.01, Sections 130 through 136. Specifically, the University will notify the Department of any upset/breakdown/safety event that results in excess emissions within 24 hours, unless a longer period is necessary, as required by Section 134.02.b. We do request, however, an allowance to submit the notification within 24 hours of the event or on the next business day after the event begins if the event occurs on a holiday or weekend. The purpose of this change is to allow the University flexibility to not necessarily supply a steam plant supervisor on a holiday or weekend to prepare a notification. The notification would be prepared and submitted on the next business day. The University believes that Department personnel are not normally present on holidays or weekends to receive the notice.

The University will also continue to submit excess emissions reports as required by Section 135 within 15 days after the beginning of each excess emissions event.

Removal of Opacity Observations Requirement – Please delete the paragraph 2.8 monthly visible emissions inspection requirement. The authorizing rule citations for this permit condition – IDAPA 58.01.01.322.06, .07, and .08 – address the Department's requirements to include in approved operating permits requirements for monitoring, recordkeeping, and reporting that are adequate for the purpose of ensuring compliance with substantive requirements. The University's only non-insignificant point sources are the wood-waste-fired boiler, the natural gas-fired boilers, and the emergency diesel generators. The wood-waste-fired boiler employs a continuous opacity monitor to continuously measure and record the opacity of its emissions. The University maintains

that, for this source, requirements associated with the operation of a continuous opacity monitor satisfy the intent of the rule and do so in a more comprehensive manner than the monthly visual inspection requirement. With respect to the natural gas-fired boilers, the permit explicitly states that no compliance demonstrations are necessary to establish compliance with the grain-loading standard and the visible emissions standard (see Permit Conditions 4.4 and 4.5). Finally, the emergency generators operate infrequently, making monthly observations of these sources unnecessary and impractical.

Multiclone Pressure Drop as a Permit Condition – Paragraph 3.8 imposes a requirement relative to the wood-waste-fired boiler multiclone, requiring that, upon renewal of the Tier I permit, "the specific operating range developed and listed in the O&M manual pursuant to Permit Condition 3.6 shall be incorporated into the modified or renewed permit as a federally enforceable permit condition."

The rule citation provided as a basis for this requirement is IDAPA 58.01.01.322.01, which reads as follows: "Emission Limitations and Standards. All Tier I operating permits shall contain emission limitations and standards, including, but not limited to, those operational requirements and limitations that assure compliance with the applicable requirements identified in the application, or determined by the Department to be applicable to the source."

The University requests that this requirement be removed from the permit for the following reasons.

The referenced Permit Condition 3.6 requires the University to maintain an Operations and Maintenance (O&M) manual for the wood-waste-fired boiler's multiclone. The condition describes several operations and maintenance factors that are to be addressed in the manual. One of these is "normal operating conditions, which shall include multiclone pressure drop ranges for the steam production range of the wood-waste-fired boiler." Permit Condition 3.8 does not specify a parameter or parameters that are to characterize a "specific operating range." It can be inferred that the pressure drop across the multiclone was intended since it is the only quantitative operating parameter addressed in Permit Condition 3.6.

As a part of this renewal application, the University is submitting a Compliance Assurance Monitoring (CAM) Plan for the wood-waste-fired boiler (see Appendix C). According to that plan, the University will monitor and record multiclone pressure drop and initiate prescribed activities when the reading appears outside the specified range.

There is no direct correlation between multiclone pressure drop and stack emissions. As noted in the CAM Plan, a measured pressure drop across the multiclone that lies outside the normal range indicates only the potential for compromised operational efficiency. Consequently, multiclone pressure drop is not an appropriate direct indicator of compliance with underlying emission limits.

The IDAPA 58.01.01.322.01 requirement that Tier I permits include – as deemed appropriate – "operational requirements and limitations that assure compliance with applicable requirements" is satisfied by the permit conditions to operate the multiclone, monitor its performance, continuously measure opacity, and periodically measure particulate emissions.

Wood-Waste-Fired Boiler Steam Capacity Change – The University conducted an emissions test on the wood-waste-fired boiler on January 5, 2005. The test was submitted to and approved by the Department. The boiler's particulate emission rate was measured three separate times in accordance with EPA Test Method 5 and associated test methods. All three tests indicated particulate emission rates below the particulate matter and PM_{10} emission limits in Permit Condition 3.3. Average values for the three samples were as follows:

- PM – 0.034 gr/dscf at 8% O_2
- PM_{10} – 5.9 lb/hr (as PM)
- Steam production rate – 55,700 lb/hr

Permit Condition 3.5.2 allows the University to increase the wood-waste-fired boiler steam production limit stated in paragraph 3.5.1 based on test data such as those described above. Specifically, the limit may be increased up to 120 percent of the average steam production rate achieved during the most recent DEQ-approved test, provided the applicable PM grain loading standard would not be exceeded at such a rate. Assuming a near-linear relationship between steam production rate and grain loading, a 20 percent increase in average steam production – to a value of 66,800 lb/hr – would result in an average PM grain loading of 0.041 gr/dscf @ 8% O_2. This is well below the permit grain loading limit of 0.080 gr/dscf @ 8% O_2.

Considering the preceding test data and analysis, and in accordance with provisions in paragraph 3.5.2, the University requests that the wood-waste-fired boiler steam production limit stated in paragraph 3.5.1 be increased from 52,300 lb/hr to 66,800 lb/hr. Also, please change the maximum steam production rate reference in paragraph 3.5.1.

Wood-Waste-Fired Boiler Emission Factor Change – Permit Condition 3.16 provides PM_{10}, NO_x, and CO emission factors to be used when calculating annual emissions for comparison with the applicable emission rate limits. The current factors are derived from EPA standard emission factors, but paragraph 3.16 provides a process for modifying the factors: "The permittee may use emission factors developed through DEQ-approved performance testing in place of the emission factors listed in Table 3.4, provided they are in the same units as the emission factors listed in Table 3.4, are formally approved by DEQ, and changed in this permit."

As noted above, the University conducted a particulate emissions test on the wood-waste-fired boiler on January 5, 2005. Emissions of CO were measured in March of 1998. Methods and results of both tests were reported to, and approved by, the

Department. For the Department's reference, copies of summary reports for both tests are included with this letter as Appendix E.

In accordance with the procedure provided in paragraph 3.16, the University requests the following changes to the PM_{10} and CO emission factors presented in Table 3.4:

Pollutant	Emission Factors (lb/1000 lb steam)		Basis
	Current	Proposed	
PM_{10}	0.2395	**0.1100**	2005 source test; average of three samples
CO	0.5200	**0.0861**	1998 source test; maximum of three samples

Note that the PM_{10} emission factor was calculated from the average PM concentration of three samples. Because PM_{10} concentration is a portion of PM concentration, the derived emission factor provides a conservatively high estimate of PM_{10} emissions. Uncontrolled CO emissions from the wood-waste-fired boiler are inherently more variable than particulate emissions, which are controlled by a multiclone. The CO emission factor was therefore calculated using the highest concentration measured for three test samples.

Natural Gas Boiler Addition – The University wishes to add to its Tier I operating permit authorization to operate a natural gas-fired boiler that has existed on-site since at least 1963 but has not been operated since issuance of the University's current air quality permits. The boiler, which will be designated Boiler S-BC, was manufactured by Babcock and Wilcox and has a rated heat input capacity of 78.6 MMBtu/lb. The University understands that addition of the boiler to the Tier I operating permit is conditioned upon prior approval from the Department to incorporate the boiler in a Permit to Construct. The University is submitting a Permit to Construct application concurrent with this Tier I renewal application. The PTC application contains the following detailed information pertaining to Boiler S-BC and the basis for its addition to the permits.

- Construction Date – Information the University has previously submitted to the Department in support of air quality permit applications has stated that Boiler S-BC, then identified as Natural Gas Fired Boiler S-B1, was installed in 1963. Consequently, its construction predates federal and state air quality rules and can be considered a "grandfathered" source with no specific requirements other than the visible emissions limit of IDAPA 58.01.01.625 and particulate matter limit of 58.01.01.676. Further, the University certifies that since the boiler's installation, it has not been modified in a manner that could have potentially increased air emissions.

- Prior Department Review and Preliminary Approval – The University submitted an application for a Tier II operating permit in July 1995. An initial application for a Tier I operating permit was submitted in March 1996, with updates submitted in August 1998 and January 1999. On June 3, 2002, the Department issued a proposed Tier II operating permit that included the S-BC (formerly S-B1) boiler. It is our understanding that the boiler would be listed in the current permits except that the University requested in a July 8, 2002, letter that it be removed from the Tier II permit application. At the time, the University believed the boiler would never again be operated. Since that time, the University has decided to re-activate the boiler and keep it in standby or back-up service.

- Ambient Concentration Impacts Demonstration – The University's Tier II permit application provided an evaluation of ambient concentration impacts from sources that included Boiler S-BC. The Department reported on its review and approval of the modeling analysis in a memo dated October 31, 2001. The Department has recently revisited their review of the ambient concentration impacts demonstration and has verbally indicated that the analysis adequately demonstrates projected compliance with applicable air quality standards.

  It should be noted that the modeling analyses were conducted assuming combustion of natural gas in Boiler S-BC. The University confirms that the boiler is capable of combusting only natural gas and cannot burn other fuels such as fuel oil or coal.

- Toxic Air Pollutant (TAP) Emissions Evaluation – IDAPA 58.01.01.007.06.c and the Department's guidance document AZ-CH-P006, "Toxic Air Pollutant (TAP) Preconstruction Compliance Application Completeness Checklist," indicate that TAP emissions from Boiler S-BC are not regulated since it was constructed prior to July 1, 1995. Nevertheless, at the suggestion of a Department representative, the University has completed an evaluation of the compliance of Boiler S-BC with applicable air toxics emissions limits at IDAPA 58.01.01.161. The boiler's potential toxic emissions were identified and quantified in accordance with IDAPA 58.01.01, Sections 210.01 and 210.02 using emission factors published by the US EPA. Following a two-step process, the estimated potential emissions were then compared first against applicable regulatory thresholds in accordance with IDAPA 58.01.01, Sections 210.05, 585, and 586. This analysis identified four compounds that could potentially be emitted above the applicable screening emission thresholds. Emissions of these four compounds were then entered into a screening level dispersion modeling analysis in accordance with IDAPA 58.01.01.210.06, and the resulting peak ambient concentrations compared against screening threshold values provided at IDAPA 58.01.01 Sections 585 and 586.

  Results from these analyses demonstrate that emission rates or ambient concentrations of all toxic compounds potentially emitted from the S-BC Boiler are below applicable threshold limits. Detailed analysis results are being submitted with a concurrent PTC application. They have also been included with this application as Appendix F for the reader's convenience.

After reviewing the relevant regulations and discussing the matter with Department staff, the University believes it may be authorized to operate Boiler S-BC based upon the above considerations. We propose, then, that upon approval of a separately submitted PTC modification application, Boiler S-BC be added to the Tier I operating permit with conditions and limits the same as provided for the other two natural gas-fired boilers S-BA and S-BD.

Modification of Wood Boiler Fuel Restriction – The University is requesting two changes in the permit's restrictions of fuels that may be combusted in the S-BA (currently S-B00) wood-waste-fired boiler.

- Paragraph 3.9 allows the combustion of confidential paper-derived fuel. The University no longer combusts this type of material. We request that the Department remove this allowance and the associated monitoring requirement provided in paragraph 3.15 from the permit. We further request that Permit Condition 3.15, which contains fuel monitoring to demonstrate compliance with the paper-derived fuel proportion limit, be removed. The Boiler Process Description in Paragraph 3.1 also needs to be updated.
- Except for the allowance to combust a small proportion of paper (see above), Paragraph 3.9 limits the wood-waste-fired boiler to combusting only uncontaminated "wood fuel." Because of the University's research capabilities, it has received many requests to conduct test burns of alternate biofuels. We expect that, with continuing national concerns regarding energy resources, requests to evaluate alternate fuels will continue to expand. With this in mind, the University wishes to modify the operating permit to provide some flexibility to conduct such evaluations. We realize the Department's primary mandate is to protect ambient air quality through enforcement of applicable rules. We believe, however, that some degree of flexibility can be provided in the permit without potentially compromising air quality protection. Toward that end, we propose that the paragraph 3.9 boiler fuel requirement be changed to allow combustion of uncontaminated wood fuel or other uncontaminated plant-derived fuel. This would allow the option of combusting such alternative fuels as switch grass and rice hulls without allowing the possibility of introducing materials that may result in emissions of toxic materials.

Facility Emissions – Please revise the facility's air emissions inventory with updated values as provided in Appendix B to this letter.

The University certifies that a copy of this renewal application has been sent to the U.S. Environmental Protection Agency at the following address:

EPA Region 10
Air Operating Permits, OAQ-107
1200 Sixth Ave.
Seattle, WA 98101

If the Department has any questions or comments on this application, please contact either me (406-442-5768), or Mike Lyngholm at the University (208-885-5247).

Sincerely,
BISON ENGINEERING, INC.

Kim M. Mathews

for Chris Hiltunen
Project Engineer

cc: Mike Lyngholm – University of Idaho
Fred Hutchison – University of Idaho
U.S. EPA Region X, OAQ-107

Attachments:

Appendix A: Idaho Tier I Operating Permit Application Forms
Appendix B: University of Idaho Emissions Inventory
Appendix C: Compliance Assurance Monitoring Evaluation and Plan
Appendix D: Regulatory Applicability Analysis
Appendix E: Wood-Waste-Fired Boiler Emissions Test Summaries
Appendix F: Boiler S-BC Toxic Emissions Evaluation